

1962 - Wheaton

ILLINOIS STATE ACADEMY OF SCIENCE
GEOLOGY FIELD TRIP

GUIDE LEAFLET

WHEATON AREA

April 29, 1962

DuPAGE AND KANE COUNTIES

WHEATON, BARRINGTON,
ELGIN AND GENEVA
QUADRANGLES



LEADERS

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Guide leaflet and map prepared by
ILLINOIS STATE GEOLOGICAL SURVEY, URBANA

Guide Leaflet No. 62

To the Participants:


It has been said that the landscape is truly beautiful only when we understand the varied forces that have worked through the ages to develop it. The result of this understanding is increasing enjoyment and appreciation of the natural features about us.

The Geological Science Field Trip program is designed to acquaint you with the landscape, rock and mineral resources, and the geological processes that have led to their origin. With this program, we hope to stimulate a general interest in the geology of Illinois and a greater appreciation of the state's vast mineral resources and their importance to the over-all economy.

We encourage you to ask the tour leaders any questions that may occur to you during the trip. Discussion often clarifies points that otherwise would remain confused to many of the participants. We also invite your written comments upon the conduct of the trip so that we might improve them as much as possible.

Additional copies of this guide leaflet, as well as itineraries for trips that have been held in the past, may be obtained free of charge by writing to the Illinois State Geological Survey. Maps are available for 30 cents each.

We hope you enjoy today's trip and will come again.



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ILLINOIS STATE ACADEMY OF SCIENCE

Geology Field Trip

Wheaton Area

- 0.0 0.0 Assemble at Service Building parking lot southeast of main campus, heading west.
- 0.1 0.1 STOP. Turn left on East Seminary Avenue.
- 0.2 0.3 Intersection of North Scott Street and East Seminary Avenue.
- 0.2 0.5 STOP. Turn left (north) on North Main Street.
- 0.4 0.9 STOP. Intersection of North Main and Harrison Streets.
- 1.5 1.4 Lake on left **formed in an abandoned gravel pit.**
- 0.1 1.9 STOP. Junction North Main and West Chicago - Glen Ellyn Road. Continue ahead on North Main.
- 0.4 2.3 From Wheaton to Stop 1, near South Elgin, we will be traveling through the Valparaiso Morainic System of the Wisconsin Stage.
- 0.4 2.7 STOP. Turn left (west).
- 0.6 3.3 The gentle swell and swale type of topography characteristic of moraines is relatively well developed in this area.
- 0.1 3.4 Turn right (north) on Wheaton Road. CAUTION, railroad crossing. Continue ahead to Highway 64 or North Avenue.
- 0.3 3.7 SLOW. Stop light. Turn left (west) on Highway 64 (North Avenue).
- 2.6 6.3 Morainic topography is well developed in this general region. This is near the western edge of the Valparaiso System. The outer moraine of the Valparaiso System is called the West Chicago.
- 0.6 6.9 Note numerous undrained depressions indicating a relatively youthful topography. Crossing the west branch of DuPage River.
- 1.3 8.2 Viaduct over the Aurora, Elgin, and Chicago Railroad.
- 0.4 8.6 SLOW. Stop light, junction Highways 64 and 59. Turn right (north) on Highway 59.
- 0.1 8.7 For the next four miles the road roughly parallels the crest of the West Chicago Moraine.
- 0.5 9.2 Note water-filled depression on right.
- 0.4 9.6 To the west, the flat outwash plain in front of the West Chicago Moraine can be seen.
- 0.6 10.2 Note small abandoned sand and gravel pit on left.

- 0.5 10.7 Road runs through small, undrained depression here. Depressions such as this frequently contain peat material troublesome in highway construction.
- 0.7 11.4 Note pond in depression on right.
- 0.5 11.9 CAUTION. Illinois Central Railroad
- 0.9 12.8 SLOW. Turn left (west) on Stearns Road.
- 0.2 13.0 Note exposure of gravelly West Chicago till on right.
- 0.3 13.3 Stop 1. Road Cut in West Chicago Moraine Exposing Gravelly Till and Soil Profile.

The section exposed is as follows:

Soil formed in loess and till

- A horizon -- black, organically
rich, leached 8 inches
- B horizon -- gray to yellow,
leached 3 inches
- C horizon -- pebbly glacial till,
unleached, part of 5 feet
parent material

From Wheaton to this point, we traversed the Valparaiso Morainic System. Stop 1 is on the frontal moraine of the system, the West Chicago. The West Chicago is a prominent moraine which can be traced easily across northeastern Illinois from Wisconsin into Indiana. Throughout this extent, the till composing the moraine is quite gravelly, more so than the till composing numerous other moraines in northeastern Illinois.

The West Chicago Moraine is bordered by a wide outwash plain composed for the most part of fine to coarse gravel. The extensive sand and gravel deposits are due in part to the high content of gravel-size pebbles in the till. These deposits support a large sand and gravel industry in the area.

Illinois State Geological Survey Circular 299, "Sand and Gravel Resources of Kane County," by Douglas A. Block, Professor of Geology at Wheaton College, contains mineralogical analyses of 18 samples, most of which were taken from outwash and valley train deposits related to West Chicago glaciation. In the one-half to three-eighths inch size fraction of these samples, the dolomite and limestone content ranged from 61 to 91 per cent. Igneous rock content ranged from 1 to 7 per cent. The high content of limestone and dolomite pebbles and the scarcity of igneous rock types is obvious in this outcrop of West Chicago till. When we reach Stop 2, this same relationship can be seen in the gravels representing the outwash in front of the moraine.

Swell and swale topography is remarkably well displayed at many places on the West Chicago Moraine. In the vicinity of Harvard and Woodstock knob and kettle topography also is well developed on this moraine.

- 0.6 13.9 Beginning descent of front of West Chicago Moraine. Note the broad outwash plain developed in front of the moraine.
 - 0.3 14.2 Note sand and gravel pit on far right. This pit was opened only recently.
 - 0.4 14.6 Note small bog (undrained depression) at the extreme edge of West Chicago Moraine.
 - 0.3 14.9 Note pond on left.
 - 1.3 16.2 STOP. Junction. Turn right (north).
- CAUTION. Vision poor from the left.
- 0.3 16.5 Junction Highway 25. Continue straight ahead on Highway 25.
 - 0.1 16.6 Abandoned sand and gravel pit on left now utilized as city disposal grounds.
 - 0.4 17.0 The area on the right and left, between the Fox River and the West Chicago Moraine, is underlain by extensive sand and gravel deposits. Note on the left side numerous abandoned sand and gravel pits.
 - 0.5 17.5 SLOW. Turn right (east) on West Bartlett Road.
 - 0.1 17.6 Note abandoned portion of a large sand and gravel pit now being worked about two miles east at Stop 2 on this trip. These extensive deposits are part of the valley train developed along the Fox River during the West Chicago and later glacial advances.
 - 1.0 18.6 SLOW. Turn left (north).
 - 0.3 18.9 The front of the West Chicago Moraine is quite obvious on the far right. The route at this point is traversing the outwash plain deposits on the border of the Fox River valley in front of the West Chicago Moraine.
 - 0.3 19.2 T-road east. Continue ahead.
 - 0.4 19.6 SLOW. Railroad -- Chicago, Milwaukee, St. Paul, and Pacific.
 - 0.3 19.9 STOP 2. Pit of Chicago Gravel Company.

Here we can examine the nature of the outwash materials in front of the West Chicago Moraine. The deposit consists of up to 30 feet of fine to coarse sand and gravel. Approximately 2 to 4 feet of soil has developed on this deposit since its deposition. Compare the exceptionally thick A horizon here to the A horizon on the moraine at Stop 1. The difference in this thickness is largely one of topographic position rather than age.

Note the composition of the sand and gravel with reference to the discussion of mineralogical content of till and outwash of West Chicago age at Stop 1.

Cross-bedding is present on a large scale in this deposit.

- 0.2 21.1 Relatively deep valley eroded in outwash deposits. Valley trends east-west.
- 0.3 21.4 SLOW. Turn left (west) on Bluff City Boulevard.
- 0.3 21.7 Large cemetery on left.
- 0.1 21.8 Entering Elgin. Continue ahead.
- 0.4 22.2 Crossing Poplar Creek.
- 0.3 22.5 STOP. Caution. Approaching traffic does not stop.
- 0.1 22.6 Stop light. Turn left (south) on Highway 25.
- 0.4 23.0 Crossing Poplar Creek.
- 0.1 23.1 CAUTION. Railroad crossing.
- 0.3 23.4 Chicago Gravel Company plant on left.
- 1.1 23.5 Upper surface of gravel terrace.
- 0.3 23.8 Note abandoned area of the Chicago Sand and Gravel Company pit.
- 0.1 23.9 SLOW. Turn right (west) on Kenyon Road.
- 0.3 24.2 CAUTION. Railroad crossing.
- 0.6 24.8 Note large lake on left. Entering South Elgin.
- 0.3 25.1 CAUTION. East Main and South Elgin Road.
- 0.2 25.3 SLOW. Turn left (south) on Woodbury Street.
- 0.1 25.4 STOP. Turn right on East State Street. CAUTION. Railroad crossing. Descend slope to Fox River.
- 0.2 25.6 Crossing Fox River.
- 0.1 25.7 STOP. Turn left (south) on Highway 31.
- 0.9 26.6 Excellent view of Fox River Valley to left.
- 0.3 26.9 Crossing viaduct over Illinois Central Railroad.
- 0.1 27.0 Abandoned sand and gravel pit on right and left. Note the numerous large boulders in the bottom of the pit.

0.6 27.6 Note abandoned gravel pit on right.

0.6 28.2 Quarry of the Fox River Stone Company, temporarily inactive.

The section exposed near the Fox River Quarry is as follows:

Pleistocene Series

Clay and gravel.....15+ feet

Silurian System

Kankakee Dolomite, brown, porous, in
beds 1 to 5 inches thick.....20+ feet

Ordovician System

Maquoketa Shale (outcrops in glen on
south side of road) mostly concealed,
gray-green shale with thin, irregu-
lar limestone fragments.....15+ feet

0.6 29.0 Silver Glen. Ordovician Maquoketa Shale outcrops.

0.4 29.4 SLOW. CURVE, 35 miles per hour.

1.9 31.3 Abandoned sand and gravel pit in creek valley on left.

0.8 32.1 SLOW. Entering St. Charles.

0.3 32.4 STOP. Junction Highways 31 and 64. Turn left on Highway 64.

0.2 32.6 SLOW. Turn right on Highway 31.

1.2 33.8 SLOW. Entering Geneva.

0.4 34.2 Wheeler Park on right, site of a former gravel pit.

0.4 34.6 SLOW. Traffic signal. Continue ahead on Highway 31, junction U.S. 30
and 31.

0.3 34.9 Several of the homes in this region are built of native dolomite or uti-
lize dolomite as trim.

0.4 35.3 STOP. Continue ahead on Highway 31. The large home on right is built
of local dolomite.

0.7 36.0 Note stone fence on left.

0.4 36.4 CAUTION. Railroad.

0.6 37.0 Entering Batavia.

0.5 37.5 Traffic signal. Junction Highway 31 and Wilson Street.

0.1 37.6 Note Congregational Church constructed of native dolomite.

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- 0.1 37.7 Traffic signal. Junction Highway 31 and Kaneville Road. Continue ahead.
- 0.2 37.9 SLOW. Turn left on Union Avenue.
- 0.1 38.0 SLOW. Enter Frederick Beach Park and Pool. The park is the site of an abandoned quarry.
- 0.4 38.4 STOP 3. LUNCH.

The outcrop in Batavia City Park consists of two types of rock. The upper beds are earthy dolomite which weathers buff. The lower beds are gray dolomite with considerable chert which follows the bedding. In the southwest part of the park an angular unconformity can be seen between the upper and lower beds. Notice also vertical joints which have weathered to open cracks.

This quarry in the Kankakee Formation was operated during the 19th Century and some of the stone for the original building at Wheaton College is said to have been quarried here.

- 0.2 38.6 Exit of Frederick Beach Park and Pool. Continue ahead on Union Avenue.
- 0.1 38.7 STOP. Turn right on Highway 31 and Batavia Avenue.
- 0.2 38.9 Traffic signal. Turn left on Kaneville Road.
- 0.4 39.3 CAUTION. Railroad.
- 1.1 40.4 STOP. Randall Road, continue ahead.
- 0.4 40.8 SLOW. Turn left on Deerpath Road.
- 0.1 40.9 Crossing Mill Creek.
- 2.0 42.9 Turn right on Nelson Lake Road.
- 0.9 43.8 Large peat bog on left.
- 0.1 43.9 STOP 4. Batavia Peat Bog.

The Batavia Bog is located in a cut-off channel of the Fox River formed when the Minooka Glacier blocked the Fox north of St. Charles. This former temporary valley is now occupied in part by Otter Creek, Mill Creek and Blackberry Creek. The valley is plainly visible on the topographic route map.

There are larger bogs in northeastern Illinois, but few are as accessible as this. The peat, which has a maximum thickness of 10 to 12 feet, is used as a soil conditioner by Mr. Paul Wasser. In 1960, Mr. Wasser sent a sample of marl, which occurs under the peat in the central portion of the bog, to the Illinois State Geological Survey for a calcium carbonate equivalent test. This sample tested 68 per cent calcium carbonate equivalent. Limestones produced in this immediate area test over 90 per cent. Mr. Wasser stated that the marl is about 30 feet in thickness at the point where it was drilled.

The peat is composed mostly of reed types of vegetation. In places it is relatively coarse.

We are not aware of any botanical studies of this bog. The following is a list of references supplied by Dr. Robert Evers, botanist with the Illinois State Natural History Survey, on work done in other north-eastern Illinois bogs:

Gates, F. C. 1912. The vegetation of the beach area in northeastern Illinois and southeastern Wisconsin. Bull. Ill. State Lab. Nat. Hist. 9:255-372.

Kurz, Herman, 1928. Influence of sphagnum and other mosses on bog reactions. Ecology 9:56-69.

Sherff, E. E. 1913. Vegetation of Skokie marsh. Bull. Ill. State Lab. Nat. Hist. 9:575-614.

Artist, Russell C. 1936. Stratigraphy and preliminary pollen analysis of a Lake County, Illinois, bog. Butler University Botanical Studies 3:191-198.

- 0.2 44.1 Crossing north edge of Batavia bog.
- 0.2 44.3 STOP. Turn left on Kaneville Road.
- 1.1 45.4 Note large kame ahead called Bald Mound and the large sand and gravel operation which was opened recently in the east side. A pit worked many years ago occurs on the south side. This kame contains mostly fine gravel and sand.
- 0.7 46.1 Bald Mound kame on right.
- 0.6 46.7 Front of Marseilles Moraine. Junction Kaneville and La Fox Road. Continue ahead on Kaneville Road.
- 1.7 48.4 Junction of Green Road and Kaneville Road. Continue ahead on Kaneville Road. Area of Farm Ridge Ground Moraine.
- 1.0 49.4 Note kame on right side of road, with active gravel pit.
- 0.2 49.6 STOP. Junction Kaneville Road and Highway 47. Turn left on Highway 47.
- 0.1 49.7 Note large bog on right has been converted to a fishing lake.
- 2.3 52.0 There are numerous gravel pits along the long, linear ridge on far right.
- 0.8 52.8 Note bog on right and left.
- 0.3 53.1 Large bog on right. The numerous bogs in this region indicate poor drainage, a characteristic of relatively youthful topography.

1.1 54.2 STOP 5. Kaneville Esker, composed of coarse to fine cross-bedded sand and gravel.

This is the best developed esker in Illinois. It can easily be traced for more than five miles. In most aspects, this esker conforms to the definition of eskers as set forth in physical and glacial geology textbooks. Richard Flint, in his book Glacial and Pleistocene Geology, discusses ways in which eskers may form:

Eskers are formed in several distinct ways, of which two seem to be more common than the others. The most common mode of origin appears to have been in tunnels (less commonly in open canals) at the base of the glacier, during so late a phase of deglaciation that the ice was thin and stagnant or nearly so. It is unlikely that tunnels could easily form or, once formed, stay open unless the ice that inclosed them was nearly motionless. If stagnant, the ice must also have been thin. Water derived chiefly from surface melting worked its way downward through crevasses and other openings and at the base of the ice enlarged systems of openings to form tunnels. The lowest possible channelways were sought, which is why eskers generally occupy valleys. Passing through these openings, chiefly under hydrostatic pressure, the water emerged in ponded bodies (a glacial lake or the sea) at the glacier's terminus. There is little in the eskers to indicate whether a long individual was formed at the same time throughout its length, or whether its downstream part was built first and was gradually added to in the upstream direction as thinning and stagnation affected an increasingly wide terminal zone. Unless the whole of the esker, after completion, was protected by inclosing ice, it is not easy to account for its preservation from destruction by proglacial stream erosion or from burial beneath outwash.

Another way in which eskers originate was first suggested by Shaler and later detailed almost simultaneously by De Geer in Sweden and by Hershey in North America. De Geer showed that certain eskers in Sweden consist of short segments, each segment beginning upstream with coarse gravel and grading downstream into fine sediments. The coarse upstream part is narrow, but downstream the esker broadens into a distinct delta. From these facts he inferred that each segment represented the deposit made during one year, chiefly in the summer ablation season. The narrow part of the esker was made in a short subglacial tunnel leading to the terminus, at which the delta was built and beyond which the stream was free to spread beyond the confining walls of the tunnel.

Two other hypotheses are that eskers form in superglacial stream valleys and in englacial tunnels respectively. Both hypotheses state that as the glacier thins the deposited sediments are gradually let down on to the ground beneath. One merit claimed for these hypotheses is that they explain the tendency of some eskers to climb over divides, without the necessity of supposing that the streams were controlled hydrostatically.

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The third part of the report is to be written by the student.

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Flint's discussion indicates a general feeling that eskers form under stagnant ice condition. The nature of the Farm Ridge deposits suggest stagnation of the Farm Ridge glacier. The suggestion that the Kaneville esker might represent a crevasse filling has also been advanced.

- 1.0 55.2 Turn left on gravel road.
- 0.1 55.3 SLOW. Bridge.
- 0.1 55.4 Note sand and gravel pit at south end of Kaneville Esker on right.
- 0.8 56.2 SLOW. Turn left (north) on Bliss Road.
- 1.6 57.8 SLOW. Turn right (east) on Healy Road.
- 0.2 58.0 Note small kame to left with pine trees on summit.
- 0.7 58.7 SLOW. Turn left on Norris Road.
- 0.1 58.8 Turn right on Tanner Road.
- 0.3 59.1 Crossing Lake Run Creek.
- 0.1 59.2 Small abandoned gravel pit on right.
- 1.1 60.3 Small undrained depression on right and left.
- 0.5 60.8 Turn right on Deerpath Road.
- 0.2 61.0 Turn left on Oak Street Road.
- 1.3 62.3 STOP. Randall Road. Continue ahead on Oak Street Road.
- 0.6 62.9 The depression between the road and the race track on the far right is believed to be a former valley of the Fox River during a temporary diversion.
- 0.1 63.0 On right, the house of the future?
- 0.3 63.3 CAUTION. Railroad.
- 0.2 63.5 STOP. Turn right on Highway 31.
- 0.1 63.6 Traffic light. Turn left (east) on Highway 55.
- 0.1 63.7 CAUTION. Railroad and Fox River Bridge.
- 0.3 64.0 Traffic signal, junction 55 and 25. CAUTION. Railroad crossing, turn right (south) on Highway 25.
- 0.4 64.4 CAUTION. Railroad.
- 0.1 64.5 Turn left into Quarry entrance of Conco Western Stone Company.

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the study and the objectives of the research. It also provides a brief overview of the methodology used in the study.

2. The second part of the report is a detailed description of the methodology used in the study. It discusses the data collection methods, the sample size, and the statistical analysis techniques used.

3. The third part of the report is a discussion of the results of the study. It presents the findings of the research and discusses their implications for the field of study.

4. The fourth part of the report is a conclusion and a summary of the findings. It provides a final assessment of the study and its contributions to the field.

5. The fifth part of the report is a list of references. It includes all the sources cited in the study, providing a comprehensive list of the literature used.

6. The sixth part of the report is an appendix. It contains additional information that supports the findings of the study, such as raw data or detailed calculations.

7. The seventh part of the report is a bibliography. It lists all the books, articles, and other sources used in the study, providing a complete list of the references.

8. The eighth part of the report is a list of figures and tables. It provides a detailed description of each figure and table, including the data presented and the conclusions drawn from them.

9. The ninth part of the report is a list of abbreviations. It defines the abbreviations used throughout the study, ensuring that the reader can understand the terminology used.

10. The tenth part of the report is a list of symbols. It defines the symbols used in the study, providing a clear and concise list of the notation used.

11. The eleventh part of the report is a list of acronyms. It defines the acronyms used in the study, ensuring that the reader can understand the abbreviations used.

12. The twelfth part of the report is a list of footnotes. It provides additional information that is not included in the main text of the study, such as references or clarifications.

13. The thirteenth part of the report is a list of appendices. It provides a detailed description of each appendix, including the data presented and the conclusions drawn from them.

14. The fourteenth part of the report is a list of references. It includes all the sources cited in the study, providing a comprehensive list of the literature used.

15. The fifteenth part of the report is a list of figures and tables. It provides a detailed description of each figure and table, including the data presented and the conclusions drawn from them.

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17. The seventeenth part of the report is a list of symbols. It defines the symbols used in the study, providing a clear and concise list of the notation used.

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19. The nineteenth part of the report is a list of footnotes. It provides additional information that is not included in the main text of the study, such as references or clarifications.

20. The twentieth part of the report is a list of appendices. It provides a detailed description of each appendix, including the data presented and the conclusions drawn from them.

21. The twenty-first part of the report is a list of references. It includes all the sources cited in the study, providing a comprehensive list of the literature used.

22. The twenty-second part of the report is a list of figures and tables. It provides a detailed description of each figure and table, including the data presented and the conclusions drawn from them.

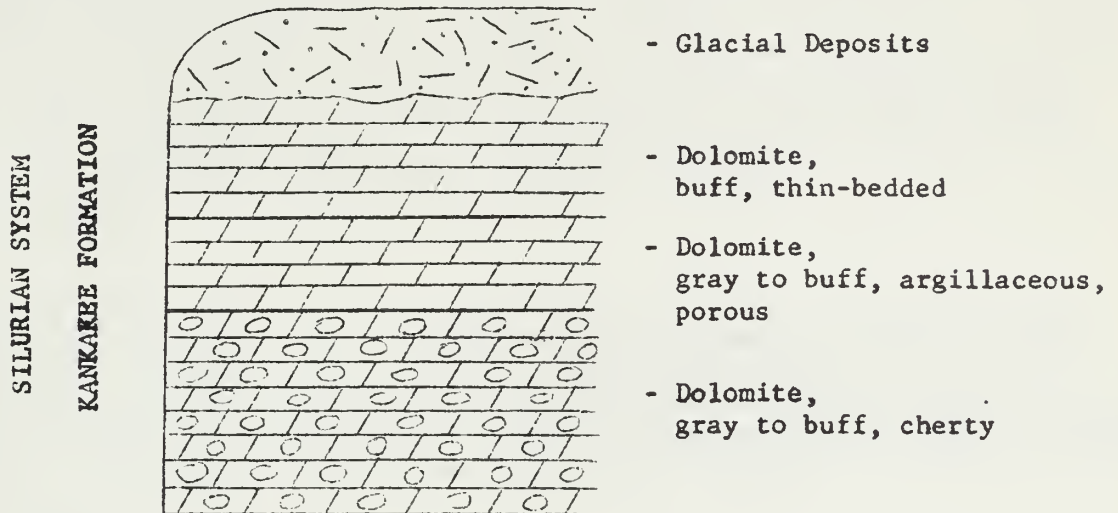
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0.3 64.8 STOP 6. Pit of Conco Western Stone Company.

The quarry consists of about forty feet of Silurian Kankakee Formation. The upper portion is gray dolomite; the lower part is gray and greenish dolomite with considerable chert. Corals, brachiopods and trilobites may be found in the quarry.



End of Trip

GEOLOGIC HISTORY OF THE AREA

DEEPLY BURIED FORMATIONS

The oldest bedrock strata that come to the surface in the field trip area are shale and limestone of late Ordovician Age. The accompanying geologic column shows that the beds, lying low in the Paleozoic system, are very ancient. Deep well-borings show that beneath them are older dolomites and sandstones of Ordovician Age, under which lies a thick series of Cambrian sandstones, dolomites, and shales. The deepest borings reveal red sandstones belonging to the very ancient pre-Cambrian complex. Many of the Cambrian and Ordovician layers contain abundant fossils of marine animals. They show clearly that in ancient time seas covered Illinois and the interior of the North American continent.

ORDOVICIAN STRATA

The upper Ordovician shales and limestones that crop out beneath jutting ledges of Silurian dolomite along Fox River belong to the Maquoketa Formation. The beds contain abundant fossils, notably brachiopod shells and coral-like bryozoa. Because the shales are soft and weak and the overlying Silurian dolomite is strong and firm, this combination of strata has caused small cascades to develop in the rocky glens along Fox River from Elgin to St. Charles.

SILURIAN STRATA

The Silurian strata that lie above the Maquoketa Formation are dolomites belonging to the Edgewood, Kankakee, and Joliet Formation, in ascending order. The formations range from Lower to Middle Silurian in age and are distinguished from one another by differences in character of the dolomite and of the fossil content. The dolomites are a valuable mineral resource quarried for building stone, crushed to use for roads and concrete, and ground for agstone to sweeten the soil.

YOUNGER PALEOZOIC STRATA

The Silurian strata are the youngest bedrock now present in the area, but younger strata of Devonian and Mississippian age once covered the region, with a possibility that Pennsylvanian stratum also was once present.

LONG INTERVAL OF EROSION

Since beds of these ages were deposited in the area, there has been ample time for their subsequent removal by the wearing-down forces of erosion. The region has been a land area from which earth and stone have been worn away by water and wind since late in the Paleozoic Era. As a result, there remains little or no direct evidence of the geologic events that took place during those hundreds of millions of years of geologic time. Not until the geologic yesterday, when the glacial ice sheets moved down from the Arctic, do we again find deposits, in the form of glacial debris, which can be used as evidence in the reconstruction of the area's geologic history.

GLACIAL PERIOD

To the geologist, the Glacial or Pleistocene Epoch merges gradually with the present. A mere 12,000 years or so has elapsed since the last ice sheet melted away, and in that short span erosion has only just begun to strip away the glacial

deposits. Thus we can work out the Pleistocene history in considerable detail. We know, for instance, that during the Pleistocene there were four separate major advances of continental glaciers with intervals of warm climate between. The warm intervals lasted far longer than the length of time since the last ice sheet, the Wisconsinan, disappeared from this region. Before the Wisconsinan ice sheet was the Illinoian, preceded by the Kansan, and that in turn by the Nebraskan.

We do not know, through lack of evidence, whether all four of the ice sheets covered the present area; but there is definite record of the Illinoian and abundant evidence of the Wisconsinan. Between the two glacial invasions, a mild climate lasted a hundred thousand years or so. During the interval there first accumulated over the uplands a blanket of wind-blown dust that the winds picked up from the raw glacial deposits in the sediment-choked rivers, sifting it gently across the prairies and highlands. In time, soils developed, and the humic acids and downward percolating rain waters (high in carbonic acid) leached and chemically changed the underlying glacial drift and debris.

MORAINES

The region visited by the field excursion is one famous in North America for the complexity of its glacial history and the remarkable preservation of its glacial deposits. Deposits of continental glaciers assume many forms and conditions. First, there are the moraines, composed largely of glacial till. Till is a mixed and unsorted mass of clay, silt, sand, pebbles, cobbles, boulders--whatever material was incorporated in the glacial ice and was left behind when the glacier melted away. Till is generally present as a more or less continuous blanket covering the surface over which the glacier moved. In areas where the glacier receded rapidly, the till blanket may be relatively level and thin; this is the "ground moraine." Where melting and forward movement were balanced, so that the ice margin was stable for a long period, "terminal moraines" developed. They are characterized by greater elevation and a rolling or "knob and kettle" topography and commonly show numbers of large glacial boulders, or "erratics." In addition to the till deposits are glacio-fluvial or glacio-lacustrine deposits--that is, glacial drift that has been transported and deposited by the melt water from the glaciers. The most outstanding deposits of this type are glacial outwash, eskers, and kames.

GLACIAL OUTWASH

When the ground in front of a melting glacier slopes gently away from the ice front, the waters streaming down slope from the melting ice deposit sand and gravel in alluvial fans. The fans eventually merge to form an outwash apron or outwash plain. The most evident outwash plain to be observed along the field trip route is that in front of the West Chicago Moraine.

KAMES

When ground in front of a glacier slopes toward the glacier, the waters from the melting ice are ponded and glacial lakes are formed, surrounded by high ground on the one side and by the high ice wall on the other. When streams flowing out of the melting ice enter such temporary lakes, deltas are formed which have one side built against the ice wall. When the ice wall melts away, the delta slumps to a rounded knoll of sand and gravel, called a "kame." A typical kame may be seen east of the Junction between Highway 47 and the Batavia Road.

ESKERS

The streams which flow upon or under a melting glacier deposit sand and gravel in their channels just as other streams do. When the ice which walled the banks of these glacial streams melts away, the stream bed is left as a more or less winding raised embankment stretching across the country like a meandering railroad grade. Generally its interior will have been hollowed out by man, because eskers are important sources of clean, fresh sand and gravel. The Kaneville Esker northwest of Sugar Grove is the longest in Illinois.

MORAINES IN THE WHEATON REGION

In that tract of country lying between Illinois Highways 59 and 47 along the general latitude of Lily Lake - W. Chicago, the following moraine lines are encountered in going from east to west:

Woodfordian Substage
West Chicago Moraine
Minooka Moraine
Marseilles Moraine
Gilberts Moraine
Marengo Ridge

HISTORY OF FOX RIVER

Before the coming of the Wisconsin glacier, Fox River did not exist. A study of the bedrock surface shows the existence of a well-developed natural drainage pattern that has no relation to that in the area today.

The first occurrence of a sizeable stream along the general course of the present day Fox appears to have developed late in the Marseilles phase of glaciation, when the ice front had melted back until it lay east of where the river now flows. Water from the melting ice, in seeking to find its way southward down slope in front of the glacier, developed the ancestral Fox Valley.

During the next, or Minooka phase, the glacier pushed forward again and crossed the ancestral Fox from St. Charles north to Elgin. The ice blockade caused the river to swing westward and carve a new channel well shown in the area of the State School for boys, 3 miles west of St. Charles.

The Fox River cut-off is just east of Bald Knob. Southward the cut-off followed several different courses at different times.

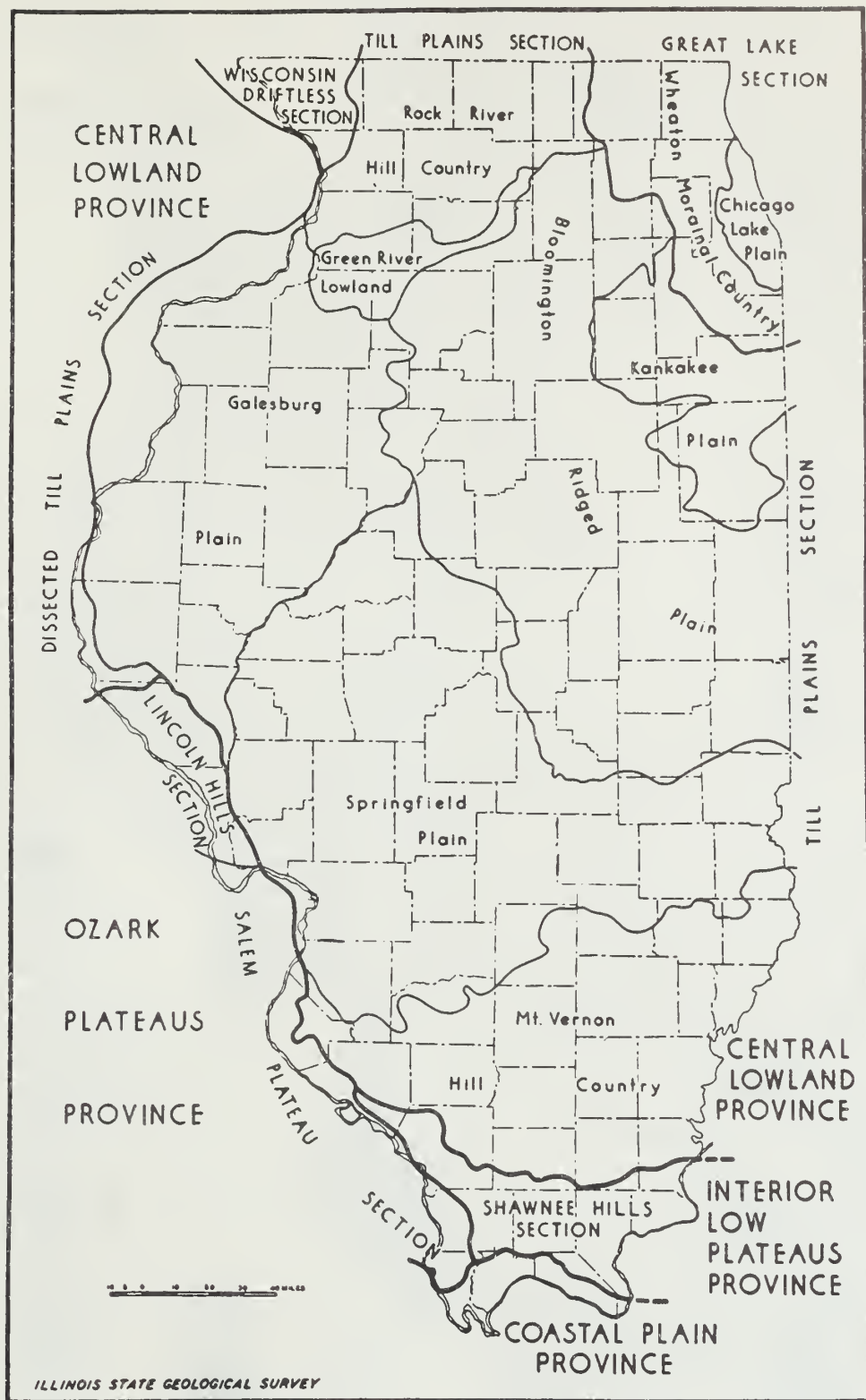
Finally, when the Minooka readvance was dissipated by melting, the river regained its old valley. Later, when the Wisconsin glacier stood along the line of the West Chicago Moraine, great quantities of sand and gravel were discharged westward into the valley, which built its floor of sediment up to the high level of the gravel terrace that flanks the river today. Since then, the river has been lowering its channel as it proceeds to cut away the fill of West Chicago glacial outwash.

GENERALIZED GEOLOGIC COLUMN
FOR WHEATON AREA
Prepared by the Illinois State Geological Survey

ERAS		PERIODS	EPOCHS	FORMATIONS
Cenozoic "Recent Life"	Age of Mammals	Quaternary	Pleistocene	*Recent post-glacial stage *Wisconsinan glacial stage *Sangamonian interglacial stage *Illinoian glacial stage *Yarmouthian interglacial stage *Kansan glacial stage
		Tertiary	Pliocene Miocene Oligocene Eocene	Not present in Wheaton Area
Mesozoic "Middle Life"	Age of Reptiles	Cretaceous		Present in extreme southern Illinois only
		Jurassic		Not present in Illinois
		Triassic		Not present in Illinois
Paleozoic "Ancient Life"	Age of Amphibians and Early Plants	Permian		Not present in Illinois
		Pennsylvanian		Not present in Wheaton Area
		Mississippian	Upper	Not present in Wheaton Area
	Lower			
	Age of Fishes	Devonian		Not present in Wheaton Area
	Age of Invertebrates	Silurian	Upper	
			Middle	*Joliet Dolomite
			Lower	*Kankakee Dolomite *Edgewood Dolomite
		Ordovician	Upper	*Maquoketa Shales & Limestones
			Middle	Dolomites and sandstone lying 200 feet below surface
			Lower	
	Cambrian		Sandstones & dolomites lying over 1,000 ft. below the surface	
Proterozoic Archeozoic		Referred to as "Pre-Cambrian" time. * Deposits present in Wheaton Area		

Time Table of Pleistocene Glaciation
(after M. M. Leighton and H. B. Willman, 1950, J. C. Frye and H. B. Willman, 1960)

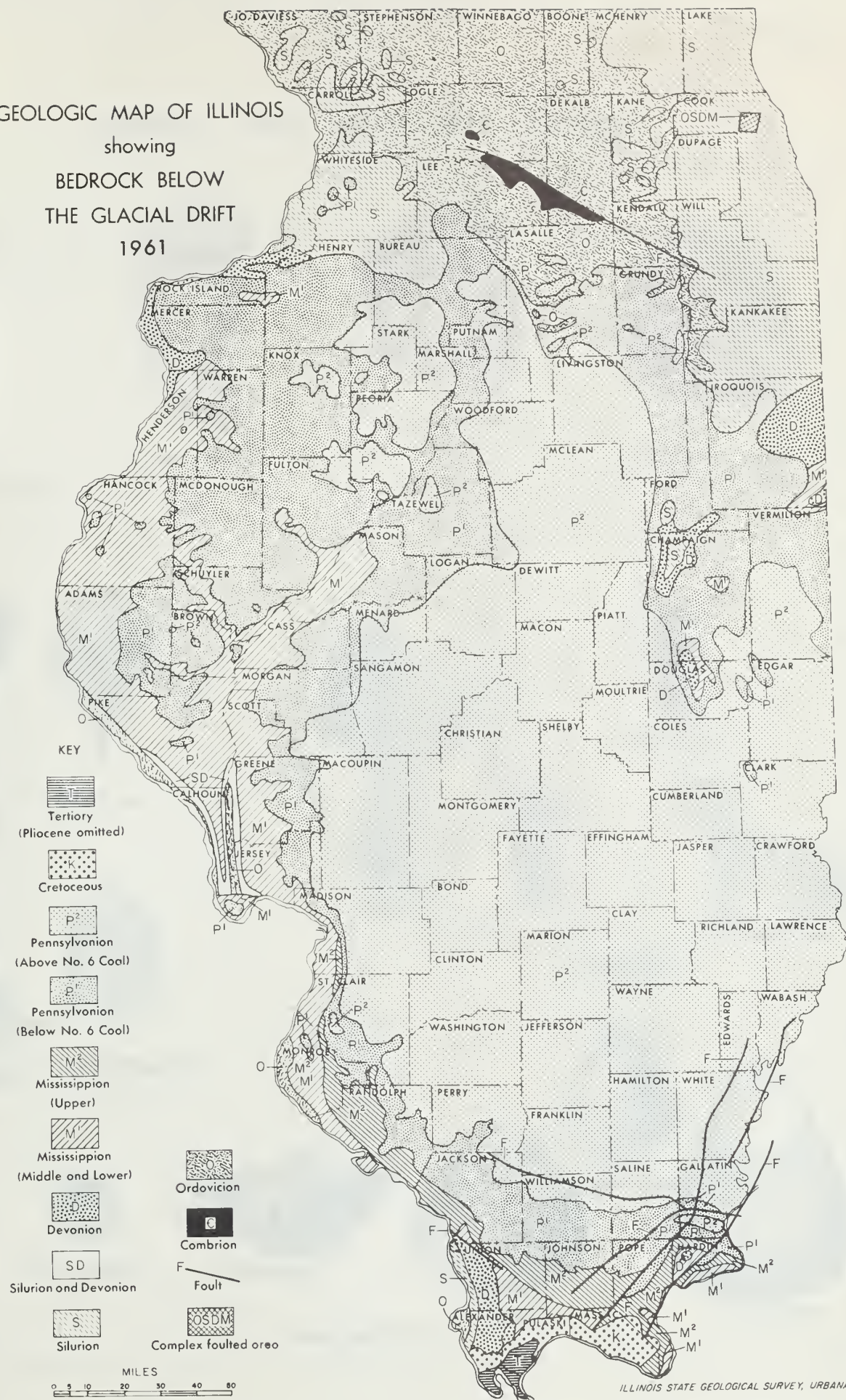
Stage	Substage	Nature of Deposits	Special features
Recent		Soil, youthful profile of weathering, lake and river deposits, dunes, peat	
Wisconsinan	5,000 yrs. Valderan	Outwash	Glaciation in northern Illinois
	11,000 yrs. Twocreekan	Peat, alluvium	Ice withdrawal, erosion
	12,500 yrs. Woodfordian	Drift, loess, dunes lake deposits	Glaciation, building of many moraines as far south as Shelbyville, extensive valley trains, outwash plains, and lakes
	22,000 yrs. Farmdalian	Soil, silt and peat	Ice withdrawal, weathering, and erosion
	28,000 yrs. Altonian	Drift, loess	Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift
	50,000 to 70,000 yrs.		
Sangamonian (3rd interglacial)		Soil, mature profile of weathering, alluvium, peat	
Illinoian (3rd Glacial)	Buffalohartan	Drift	
	Jacksonvillian	Drift	
	Paysonian (terminal)	Drift	
	Lovelandian (Pro-Illinoian)	Loess (in advance of glaciation)	
Yarmouthian (2nd interglacial)		Soil, mature profile of weathering, alluvium, peat	
Kansan (2nd glacial)		Drift Loess	
Aftonian (1st interglacial)		Soil, mature profile of weathering, alluvium, peat	
Nebraskan (1st glacial)		Drift	



PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

(Reprinted from Illinois State Geological Survey Report of Investigations 129, "Physiographic Divisions of Illinois," by M. M. Leighton, George E. Ekblaw, and Leland Horberg)

GEOLOGIC MAP OF ILLINOIS
showing
BEDROCK BELOW
THE GLACIAL DRIFT
1961



COMMON TYPES of ILLINOIS FOSSILS



GRAPTOLITE

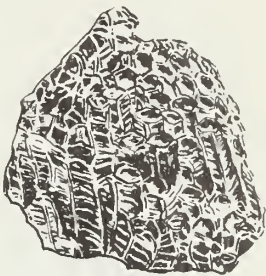


Cup coral



Lithostrotion

CORALS



Honeycomb coral



CRINOID



CYSTOID



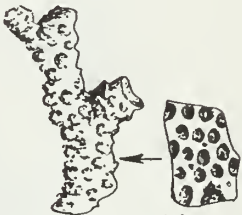
PENTREMITE



Fenestella



Archimedes



Branching

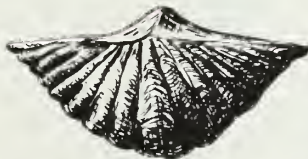
BRYOZOA



Lingula



Orbiculoidea



Spiriferoid



Productoid



Composita



Pentameroid

BRACHIOPODS



COMMON TYPES of ILLINOIS FOSSILS



"Clam"



"Scallop"

PELECYPODS



High-spired



Low-spired



Flat-spired

GASTROPODS



Curved cone



Straight cone



Coiled cone
(Nautilus)

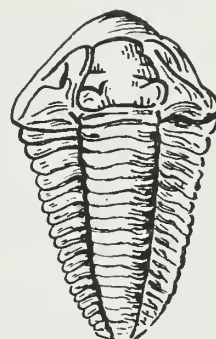
CEPHALOPODS



Bumastus



Calymene
(coiled)



Calymene
(flat)

TRILOBITES



OSTRACODS
(greatly enlarged)



